

## **ABSTRACT**

The present invention is directed to a method and system of tissue or background suppression for the acquisition of image data from blood flow or tissue perfusion. Background suppression with minimal effects upon inflowing spins is achieved through a series of spin locking low level RF pulses that cause adiabatic demagnetization of tissue with a relaxation time  $T1\rho$  that is intermediate between  $T1$  and  $T2$  relaxation times. In this regard, the effective transverse magnetization of static tissue resulting from the application of a series of low level RF pulses is reduced and, with the spin locking, longitudinal magnetization regrowth is minimized. As such, inflowing spins to an imaging volume may be directly imaged with significant background tissue suppression. The present invention is particularly applicable to time-of-flight MRA and MR perfusion imaging.